

WHAT IS CLAIMED IS:

1. A process for producing a stable rare earth tris (organophosphate) solution comprising reacting an organophosphate salt solution, prepared by reaction of an acid and a base, with a rare earth salt in the presence of a solvent which is selected from the group consisting of hydrocarbon solvents, mixtures of water and hydrocarbon solvents, and mixtures thereof, to form a rare earth tris (organophosphate) solution; wherein said rare earth tris (organophosphate) solution has a free acid to rare earth element molar ratio of less than or equal to about 5.

2. The process according to claim 1 wherein the solvent is a hydrocarbon solvent.

3. The process according to claim 2 comprising the additional step of adding a stabilizing additive selected from the group consisting of: propylene glycol (1,2-propanediol), di(propylene glycol), ethylene glycol (1,2-ethanediol), di(ethylene glycol), 1,2- and 1,3- and 1,4-butanediol, ethylene glycol dimethyl ether, ethylene glycol diethyl ether, ethylene glycol dipropyl ether, ethylene glycol dibutyl ether, ethylene glycol ethyl ether, ethylene glycol butyl ether, ethylene glycol tert-butyl ethyl ether, ethylene glycol tert-butyl methyl ether, ethylene glycol butyl vinyl ether, ethylene glycol diglycidyl ether, propylene glycol dimethyl ether (1,2-dimethoxypropane), 2,2-diethoxypropane, 3,3-diethoxy-1-propanol, propylene glycol butyl ether, propylene glycol monomethyl ether (1-methoxy-2-propanol), propylene glycol phenyl ether, propylene glycol propyl ether, and mixtures thereof.

4. The process according to claim 3 wherein the molar ratio of stabilizing additive to rare earth element is less than or equal to about 5.

5. The process according to claim 1 wherein said rare earth tris (organophosphate) solutions has a molar ratio of water to rare earth element of less than or equal to about 1.

6. The process according to claim 1 comprising the additional step of adding an acid selected from the group consisting of: phosphoric acid (H_3PO_4); mono and di alkyl esters of phosphoric acid; o- phosphorous acid (H_3PO_3); metaphosphoric acid; mono alkyl phosphonic acids; mono esters of alkyl phosphonic

00552749 000001

acid; organic derivatives of phosphinic acid; sulfuric acid; pyrosulfuric acid; alkane and arene sulfonic acids; sulfanilic acid ($4-(H_2N)C_6H_4SO_3H$); alkane and arene sulfinic acids; boric acid ($B(OH)_3$); metaboric acid (HBO_2); and mixtures thereof.

7. The process according to claim 6 wherein the molar ratio of free acid to rare earth element is less than or equal to about 2.

8. The process according to claim 1 wherein the reaction temperature is greater than about $30^\circ C$.

9. A process for producing a stable rare earth tris (organophosphate) solution comprising the steps of:

a) reacting an organophosphate salt solution, prepared by reaction of an acid and a base, with a rare earth salt in the presence of a solvent which is selected from the group consisting of hydrocarbon solvents or mixtures of water and hydrocarbon solvents, to form a rare earth tris (organophosphate) solution having an aqueous phase and an organic phase;

b) removing the aqueous phase;
c) washing the organic phase with water; and
d) adding a stabilizing additive selected from the group consisting of: water, acids, esters of acids, glycols (diols) and their ether derivatives, and mixtures thereof;

wherein the reaction temperature for step a) is greater than about $30^\circ C$ and the stabilizing additive to rare earth element molar ratio is less than or equal to about 5.

10. The process according to claim 9 wherein the solvent is a hydrocarbon solvent.

11. The process according to claim 9 wherein the stabilizing additive is selected from the group consisting of: propylene glycol (1,2-propanediol), di(propylene glycol), ethylene glycol (1,2-ethanediol), di(ethylene glycol), 1,2- and 1,3- and 1,4-butanediol, ethylene glycol dimethyl ether, ethylene glycol diethyl ether, ethylene glycol dipropyl ether, ethylene glycol dibutyl ether, ethylene glycol ethyl ether, ethylene glycol butyl ether, ethylene glycol tert-butyl ethyl ether, ethylene glycol tert-butyl methyl ether, ethylene glycol butyl vinyl ether, ethylene glycol diglycidyl

ether, propylene glycol dimethyl ether (1,2-dimethoxypropane), 2,2-diethoxypropane, 3,3-diethoxy-1-propanol, propylene glycol butyl ether, propylene glycol monomethyl ether (1-methoxy-2-propanol), propylene glycol phenyl ether, propylene glycol propyl ether, and mixtures thereof.

12. The process according to claim 9 wherein the molar ratio of water to rare earth element is less than or equal to about 1.

13. The process according to claim 9 wherein the stabilizing additive is selected from the group consisting of: phosphoric acid (H_3PO_4); mono and di alkyl esters of phosphoric acid; o- phosphorous acid (H_3PO_3); metaphosphoric acid; mono alkyl phosphonic acids; mono esters of alkyl phosphonic acid; organic derivatives of phosphinic acid; sulfuric acid; pyrosulfuric acid; alkane and arene sulfonic acids; sulfanilic acid (4-(H_2N) $C_6H_4SO_3H$); alkane and arene sulfinic acids; boric acid ($B(OH)_3$); metaboric acid (HBO_2); and mixtures thereof.

14. The process according to claim 9 wherein said reaction temperature ranges from about 40 ° C to about 60 ° C.

15. A product comprising:

- a) a rare earth tris (organophosphate); and
- b) a hydrocarbon solvent; wherein the molar ratio of free acid to the rare earth element is less than or equal to about 5.

16. A rare earth tris (organophosphate) solution comprising:

- a) a rare earth tris (organophosphate);
- b) a hydrocarbon solvent;
- c) water; and
- d) a stabilizing additive selected from the group consisting of: propylene glycol (1,2-propanediol), di(propylene glycol), ethylene glycol (1,2-ethanediol), di(ethylene glycol), 1,2- and 1,3- and 1,4-butanediol, ethylene glycol dimethyl ether, ethylene glycol diethyl ether, ethylene glycol dipropyl ether, ethylene glycol dibutyl ether, ethylene glycol ethyl ether, ethylene glycol butyl ether, ethylene glycol tert-butyl ethyl ether, ethylene glycol tert-butyl methyl ether, ethylene glycol butyl vinyl ether, ethylene glycol diglycidyl ether, propylene glycol dimethyl ether (1,2-dimethoxypropane), 2,2-diethoxypropane, 3,3-diethoxy-1-propanol, propylene glycol

butyl ether, propylene glycol monomethyl ether (1-methoxy-2-propanol), propylene glycol phenyl ether, propylene glycol propyl ether; phosphoric acid (H_3PO_4); mono and di alkyl esters of phosphoric acid; o- phosphorous acid (H_3PO_3); metaphosphoric acid; mono alkyl phosphonic acids; mono esters of alkyl phosphonic acid; organic derivatives of phosphinic acid; sulfuric acid; pyrosulfuric acid; alkane and arene sulfonic acids; sulfanilic acid ($4-(H_2N)C_6H_4SO_3H$); alkane and arene sulfinic acids; boric acid ($B(OH)_3$); metaboric acid (HBO_2); and mixtures thereof;

wherein the molar ratio of water to rare earth element is less than or equal to about 2 and the molar ratio of stabilizing additive to rare earth element is less than or equal to bout 5.

17. A composition according to claim 16 wherein the rare earth tris (organophosphate) are free from precipitation from the solution for at least about twenty (20) days, preferably for at least about thirty (30) days.

99006-14-00000